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Maintaining the Marine Corps' Tank Dominant Combat
Overmatch in an Uncertain Future

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Executive Summary

Title: Maintaining the Marine Corps' Tank Dominant Combat Overmatch in an Uncertain Future

Author: Major Stephen T. Campbell, United States Marine Corps

Thesis: In the current fiscal environment, the Marine Corps must determine its future tank acquisition strategy in the near future in order to maintain a platform that will fulfill its roles beyond 2025.

Discussion: Given the realities of the modern battlefield ranging from major contingency operations to hybrid threats, the current fiscal restraints and the rapidly decreasing combat overmatch of the M1A1 Abrams tank compared to other tanks throughout the world what acquisition strategy should the Marine Corps take with regard to the next tank platform? The current tank platform in the United States Marine Corps, the M1A1 Abrams, first entered service in 1980 and was developed using 1970s technology. The Abrams tank through persistent upgrades over the last 30 years has maintained dominant combat overmatch across the range of military operations and will most likely continue to do so through the year 2025. However, the life expectancy of the current platform is nearing its end, and the Marine Corps must determine now its future acquisition strategy with regards to what tank will best support the Marine Corps beyond 2025. This paper will present four relevant courses of action for the Marine Corps in its pursuit for the next tank: (1) continued modification of the M1A1, (2) rebuild the current M1A1 fleet to the next generation tank currently being developed by the U.S. Army, (3) field a new Joint Medium Tank, or (4) obtain a mixed fleet of tanks consisting of the M1A1 and a medium tank. This paper will briefly examine the history of tanks with regards to tank acquisition and the role tanks have played throughout history. Using its past roles, and through examination of the future battlefields that the Marine Corps expects to face across the full range of military operations it will validate the precepts required for the future tank. Finally, this paper will examine each of the four courses of action in detail and provide a recommended course of action strategy to pursue its future tank.

Conclusion: Despite the current fiscal restraints the tank has more than proved its usefulness in the Corps. Throughout history there have been little change in the platform's roles and missions in the Marine Corps, and given the precepts for the future tank the courses of action discussed in this paper are more than adequate for satisfying the future acquisition strategy for the Marine Corps.

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Preface

Over the last fifteen years it has been a privilege and an honor to serve my country as a U.S. Marine. Throughout these years I have been fortunate to serve under many great leaders and role models. Men that have mentored me professional and personally, and guided my career as if it were their own. For that I am thankful. I have also had the blessing of leading the most amazing men this country has to offer. Their performance, hard work and dedication to duty have not gone unnoticed. Despite the arduous hours and rigorous amount of work Marines are expected to perform while deployed in harms way, back home in garrison or in the field, their performance has never lagged and devotion never wavered. For this I am truly humbled and thankful.

Additionally, I have also had the benefit to serve with a different breed of Marine, the tanker. Tankers are unique in many ways. They never shy away from the fight. They are proud to stand their place on the line, then upon returning from the front will always turn to the much needed maintenance of their tanks before taking care of themselves. They take pleasure in working harder than most and pride in leading from the front. Marine tankers are truly special. I have had no greater honor than leading Marines and Marine tankers into combat. It is for the tankers I chose this topic for my thesis.

This paper is of much importance to me and of great interest. Although, I will most likely be long gone and retired before the next version of tank ever hits the fleet for the Marine Corps, I feel it is important to focus on the future of the Marine Corps' tank community. As I tried to portray in this paper, the tank and its operators are an invaluable asset to the Marine Corps, and myself and every other tanker owes it to those that follow to ensure they have the best equipment to meet the needs of the Corps in any challenge it may face.

Work on this topic began for me prior to arriving at command and staff during the Spring 2011 Tank Operational Assessment Group. The foundation of this paper was built in a week long working group made up of some of the brightest and smartest tankers in the Marine Corps. Too many to name individually, but a special thanks goes out to each of the members of the group for their hard work, insight and guidance, without them much of this paper would be impossible.

Additionally, I would like to take the time to thank my master's program mentor, Dr. Gordon, for his sound advice, time and effort on assisting me to put this together. Also an additional thank you to my military faculty advisor, Commander Newton, and civilian advisor, Dr. DiNardo for their guidance and support throughout not only this paper, but for the time here at Command and Staff.

Lastly, a special thanks to my wife, Danielle, and the kids, Ashton, Olivia, Lorelai, Braelynn and Stevie Belle for their support and understanding during many long nights of studying, research and writing during this period, and for the overall encouragement, love and support for me throughout my career.

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“Armored fist”... What better way to describe the modern Marine Corps tank? The trembling of the earth, the rumble of 72 tons of armor advancing at 40 mph across the battlefield, the concussion of 120mm High Explosive Anti-Tank rounds bursting on target, the staccato of .50 caliber machine guns firing in rapid succession with the co-axially mounted M240 machine gun. The devastating “shock and awe” effect on the enemy and the instant relief provided to the Marines on the ground. The tank’s very presence can be felt by all who enter the battlefield. However, in today’s fiscal reality some Marines are asking the hard question: “Are tanks relevant today and are they worth the money?” A brief look into the history of tanks in the Marine Corps will shed some light on the answer, and will lead to an even more profound and relevant question. “Given the realities of the modern battlefield ranging from major contingency operations to hybrid threats, the current fiscal restraints and the rapidly decreasing combat overmatch of the M1A1 Abrams tank compared to other tanks throughout the world what acquisition strategy should the Marine Corps take with regards to the next tank platform?” In the current fiscal environment, the Marine Corps must determine its future tank acquisition strategy in the near future in order to maintain a platform that will fulfill its roles beyond 2025.

Tanks first entered service in the Marine Corps in 1923, just six years after the U.S. Army, and were first deployed from 1927 to 1928 in China.¹ Since then they have played a vital role in the Marine Corps and have deployed in support of every major contingency. Tanks fill two primary roles in the Corps; they provide the MAGTF with the capability of armored maneuver and they provide lethal and survivable close tank support to the infantry as an integral part of the combined arms team.²

History

The first tanks procured by the Marine Corps were the French built 1917 Renaults armed with a 30 caliber machine gun. At the time the Marine Corps was interested in experimenting with a mobile platform for a machine gun, and thus a platoon was formed in Quantico, Virginia in 1923. Shortly after its inception the tank platoon was deployed to China where it provided critical railroad security. Despite a successful deployment and sufficient field testing of the tank concept, the platoon was disbanded soon after its re-deployment to the United States. Despite regular tank familiarization training given consistently to the officers and officer candidates in Quantico since the first platoon's disbanding, it was not until the mid 1930s with the new concept of amphibious landing on an opposed beach that the Marine Corps again drew interested in the tank.³ As a result of the emerging amphibious concept, the Marine Corps again looked to tanks as the key to move beyond the defended beachheads.

The Marine Corps first experimented with a new tank design capable of being transported by naval shipping and then offloaded at sea for an amphibious assault. The new tank design, the Marmon Herrington Tankette, proved unreliable and the Marine Corps fell back to the tested and improved M2A4 Light Tank fielded by the United States Army. The Marine Corps fielded five companies of Light Tanks at the inception of World War II, but it was the M4A2 Sherman Tank that first saw combat for the Marine Corps at Bougainville.⁴

Throughout World War II, tanks saw combat in virtually every major Marine battle. On Guadalcanal, they were utilized to guard the invaluable airfield where they were essential in repelling a multitude of Japanese attacks and conducted several counter-offensive operations. On Tarawa, tanks were used as intended, to break through the enemy's defenses on the beach. On Iwo Jima, Saipan, Okinawa, and other islands the tanks were used time and again to destroy enemy pill boxes, conduct tank-infantry patrols, repel enemy counter-offensives, and lead

Marines in the attack. By war's end, the Marine Corps expanded the role of armor by introducing the flame-thrower tanks used extensively in the caves of Saipan and the bulldozer tanks employed against enemy bunkers on Iwo Jima.⁵ Tanks also served as armored ambulances for wounded Marines and emergency armored supply carriers throughout the Pacific campaign.

A lot of thought and training had gone into the utilization of tanks to secure the beach, but very little went into the employment of tanks beyond the beachhead. As a result, early in the campaign tanks would often out run the infantry support and find themselves surrounded by the enemy, mired by the terrain, or immobilized by the enemy and picked off one by one. However, later in the campaign the tanks and infantry became a proficient combined arms team capable of working together efficiently.

With the outbreak of war in Korea, the tank again proved versatile and essential throughout the war. This time, armed with newer, larger and improved M26 and M46 Pershing tanks taken from the Army, the tanks were utilized extensively in combat. In August of 1950 alone, the 1st Marine Brigade equipped with the M26 Pershing destroyed 21 North Korean Tanks.⁶ In spite of the short period between wars and the large amount of battle hardened WWII veterans left in the Corps, the combined arms efficiency of the tank-infantry team gained during WWII had already been lost and had to be re-discovered through costly combat losses early in the campaign. Despite the set-back, the Marines quickly perfected the tank-infantry team and successfully coordinated combined arms attacks, defense and counter-attack missions, and extensive tank-infantry patrols in enemy held territory.

After Korea, throughout routine operations before, during and even after the Vietnam conflict, Marine Corps tanks became common place for deployment in various contingencies throughout the world. M48A1 Pattons deployed to Lebanon in 1958, and in 1962 they deployed

in support of the crisis in Guantanamo Bay, Cuba, and again to the Dominican Republic in 1965.

⁷ The Marine Corps tank fleet had become a mix of the medium M48 series tanks and M103 Heavy tanks in an effort to maintain the capability to respond to a broad spectrum of conflicts throughout the world.

During Vietnam the Corps deployed with the medium M48A3 Patton tank (the M103 Heavy tanks were thought to be too cumbersome for deployment to Vietnam).⁸ The Marines and their tanks conducted convoy security, destroyed bunkers and trenches, provided strong point security, conducted tank-infantry patrols, improved perimeter defenses, and even acted as artillery by firing indirect harassing or interdiction fire. Vietnam was also the last time the flame tank saw action in the Marine Corps, along with the M103 Heavy Tank. They were dropped from Marine Corps inventory shortly after the War.

In the post Vietnam era, the Marine Corps maintained the M48A3 Patton tank until the mid 1970s until it again followed suit with the U.S. Army by acquiring the M60 series Patton tank. The M60 saw combat with the Marines of 1st, 3rd, and 8th Tank Battalions in Operation Desert Storm where they were credited with the destruction of 116 Iraqi tanks and 32 armored personnel carriers.⁹

The M60A1 (RISE Passive) was not the only tank the Marine Corps utilized during Operation Desert Storm. Prior to the ground war commencement, 2nd Tank Battalion and two companies from 4th Tank Battalion fell in on the new M1A1 Abrams tanks in Saudi Arabia.¹⁰ Upon return from the ground war the Marine Corps upgraded the remainder of the tanks in the fleet with the new M1A1 Abrams.

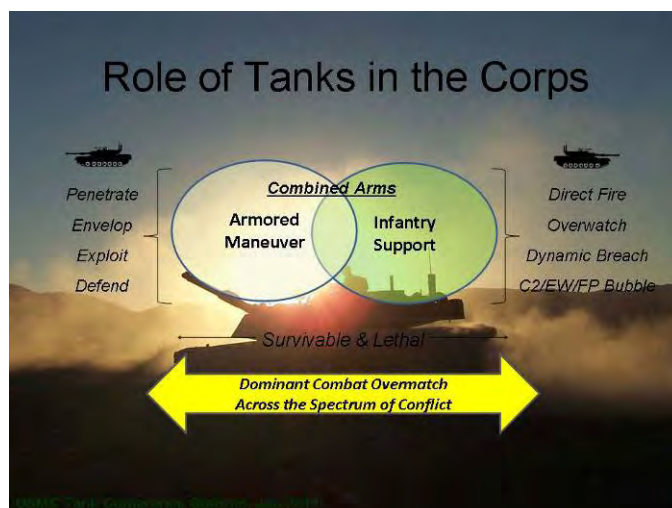
The Abrams, later upgraded to the M1A1 FEP (Firepower Enhancement Package) would be the next generation of tanks to see combat in the Marine Corps. In Iraq and now Afghanistan,

the M1A1 FEP once again proved its usefulness, flexibility and adaptability. Marine Corps tanks were crucial in the rapid advancement of the highly mobile and mechanized invasion of Iraq. They routinely conducted tank-infantry patrols, coordinated attacks as part of a combined arms team, convoy security, quick reaction forces, distributed operations, strongpoint security, and supported isolate and search operations in conjunction with the infantry. Most notably, the Abrams tank was the only platform on the battlefield that could support the infantry on the leading edge of the most vicious of battlefields like Fallujah, Nasiriyah and Baghdad with a reasonable assurance of survivability.¹¹

Roles

Tanks as can be seen have a long and storied history in the Marine Corps. They have been deployed in a myriad of operations across the battlefield spectrum. Throughout its history the two primary roles fulfilled by the tank have remained unchanged. Tanks have and will continue to provide the MAGTF with armored maneuver and lethal and survivable close tank support.¹²

Figure 1-Tanks Role in the USMC



Tanks can penetrate, envelop, exploit, and defend against our nation's adversaries through armored maneuver. They provide over the horizon communications, long-range precision direct fire, tracked mobility, organic command and control, with scalable forces from section to battalion. They provide an in-stride breach capability and an organic battle staff. In an infantry support role, tanks provide direct fire, overwatch, dynamic breaching capability, command and control, and force protection bubble. They provide an electronic warfare capability to cover the tank and dismounted troops on the ground, a varied suite of munitions, an integrated and common command and control suite, and a dynamic entry breaching capability for dismounted infantry. They are more responsive and more accurate than close air support or indirect fire. They are scalable to support the maneuver elements, and require limited sustainment with its organic support assets. Additionally, in support of both armored maneuver and infantry, tanks provide a persistent presence on the battlefield.¹³ They are all weather and CBRN capable (can fight in all chemical, biological, radiological and nuclear environments). They provide a self-entrenchment capability, long range observation and identification are capable of controlling supporting arms, and cost less to purchase and operate than aircraft. Bottom line: tanks provide dominant combat overmatch across the spectrum of conflict with overwhelming lethality and survivability on the field of battle, and they must continue to do so well into the future.

Future Environment

Before one can begin looking at the future vision and strategy of the Marine Corps' tank community we must first take into account the future battlefield and more importantly the future

threat the Marine Corps will face on the battlefield. Then, using history as our guide and some analysis of the future we can determine the precepts for future tank design.

Conflicts in the foreseeable future will find the Marine Corps fighting against a diverse set of potential adversaries, in differing threat environments, over the full range of military operations, varying from peace keeping operations, to counterinsurgency, to major combat operations. Recent evidence as shown by the war in Iraq and current posturing from nations such as Iran and North Korea that the likelihood of facing a major land army has not diminished since the collapse of the Soviet Union at the end of the 20th Century.¹⁴ However, with the collapse of the second world power came an emergence of new threats in the form of terrorists, insurgence, guerrillas, and various other non-state actors. This hybrid threat, although on the surface may not seem as dangerous to the mission of the Marine Corps, it has proven a viable threat that will encompass the majority of our time, effort and money to defeat as evident in the prolonged counterinsurgency wars in Iraq and in Afghanistan. The possibilities of the next threat we will encounter are difficult to determine as best demonstrated by the Secretary of Defense Robert Gates in a speech delivered at the U.S. Military Academy, West Point on February 2, 2011.

We can't know with absolute certainty what the future of warfare will hold, but we do know it will be exceedingly complex, unpredictable, and – as they say in the staff colleges – “unstructured.” Just think about the range of security challenges we face right now beyond Iraq and Afghanistan: terrorism and terrorists in search of weapons of mass destruction, Iran, North Korea, military modernization programs in Russia and China, failed and failing states, revolution in the Middle East, cyber, piracy, proliferation, natural and man-made disasters, and more. And I must tell you, when it comes to predicting the nature and location of our next military engagements, since Vietnam, our record has been perfect. We have never once gotten it right...¹⁵

Additionally, Marine Corps Commandant General Amos summed up this emerging threat in his 2010 planning guidance.

The rise of new powers and shifting geopolitical relationships will create greater potential for competition and friction. The rapid proliferation of new technologies, cyber warfare and advanced precision weaponry will amplify the risks, thus empowering state and non-state actors as never before.¹⁶

This new and emerging threat adds a new element to the future fight the Marine Corps will find itself in. The tank the Marine Corps uses in the future must be capable of operating in combat across the full range of military operations, being careful not to disregard either end of the spectrum of the conflict.

In addition to this emerging threat is the proliferation of more lethal weapons and equipment for use by these hybrid actors. These capabilities once resident only with traditional state armies now reside at all levels and types of adversaries. These weapons range from improvised explosive devices (IEDs), rocket propelled grenades (RPGs), and anti-tank guided missiles (ATGMs).¹⁷ All of which result in the Marine Corps having to place an even greater emphasis on equipment with high survivability characteristics.

The physical environment has also changed in recent years with this emerging threat. No longer can the Marine Corps expect to fight in the open terrain of the European theater or the open deserts of the Middle East. Most likely the Marine Corps will operate in a complex urban environment located in a third world country with poor infrastructure, an infrastructure that may impede larger vehicles or lend itself to being more susceptible to the ambush like tactics preferred by the smaller more nontraditional adversary.¹⁸ Additionally, they may be asked to operate away from the littorals and its natural naval support base as is the case for the tanks currently operating in Afghanistan.

Precepts

Given the realities of the modern battlefield ranging from major contingency operations to hybrid threats, the Marines will continue to rely on their tanks for: (1) locating, closing with and destroying the enemy with a reasonable assurance of survival and lethality overmatch, (2) providing expeditionary armored firepower and shock effect, and (3) providing persistent overwatch and precision direct fires in support of infantry operations.¹⁹

Figure 2-USMC Tank Precepts



The Abrams' capabilities currently exceed the aforementioned precepts. It provides unequalled lethality, survivability and mobility on the battlefield. It is lethal; providing precise destruction of all ground based and rotary wing threats at close and extended ranges. It is survivable; providing dominant combat overmatch against threat anti-armor weapon systems, it has the ability to take a hit from multiple direct and indirect attacks to include rocket propelled grenades, anti-tank guided missiles, and improvised explosive devices, and continue the fight.

Its firepower and mobility contribute to its overall survivability. It is mobile; cross-country mobility in the most rugged of terrain and can go where no other vehicle can with an in-stride breach capability. It is ship to shore landing craft (Landing Craft Air Cushion (LCAC)²⁰ and Landing Craft Utility (LCU))²¹ deployable, Strategic Airlift (STRATAIR) deployable and capable of deep-water fording.²²

Mission

As written, the mission of the Marine Tank Battalion is “to close with and destroy the enemy using armor protected firepower, shock effect, and maneuver, and to provide precision direct fires against enemy armor, fighting vehicles, troops and hardened positions.”²³ With the Abrams’ lethality, survivability, and mobility overmatch tank battalions have the capability to accomplish its mission well into the future. However, as modern tank technology becomes more proliferated, and the U.S. military becomes more constrained by budgetary concerns, the vision of tanks in the Corps needs to be addressed.

The role of Marine Corps tanks has not fundamentally changed in the last 80 years. Therefore, the precepts set forth in this paper should remain into the foreseeable future as well. With the roles, future environment, mission and precepts in mind there are four reasonable courses of action for the Marine Corps with regards to its future tank acquisition strategy: (1) continued modification of the M1A1, (2) rebuild the current M1A1 fleet to the next generation tank (M1A3) currently being developed by the U.S. Army, (3) field a new Joint Medium Tank, or (4) obtain a mixed fleet of tanks consisting of the M1A1 and a medium tank.²⁴

The Way Ahead

Course of action 1 continues modification of the M1A1. This presents the Marine Corps with the ability to incrementally improve the relevance and capability of the M1A1 Abrams across the range of military operations through 2040 and possibly beyond. Guided by budgetary constraints, selected improvements for the M1A3 program can be adapted to the M1A1 with incremental upgrades as needed (possibly extending the life of the M1A1 well beyond 2050). Anticipated upgrades include, but are not limited to the following: 1. A communications upgrade matching the systems utilized by the remainder of the operating forces and freeing up space inside the tank for future improvements. 2. An electrical power output upgrade reducing space utilized in the tank and freeing up more power for future electronics. 3. A fire control system upgrade (beyond the current generation 2 Forward Looking Infrared (FLIR)) that will allow for greater target acquisition and identification. 4. An improved armor and protection system, that will counter the ever-increasing lethality of the adversary weapons and possible reduce the weight of the vehicle.²⁵

Some advantages for course of action 1 include these listed points as follows. Course of action 1 will allow the tank to maintain overmatch against threat armor and anti-armor systems into the near future and equality to other tanks well into the future. It will leverage the M1A3 program for upgrades and modifications. Course of action 1 will continue to have proven technology and performance, and it will allow the USMC to tailor the M1A1 to Marine Corps specific requirements. Course of action 1 will minimize changes to the DOTMLPF (Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel and Facilities). Furthermore, there is already an existing ammunition commonality with the U.S. Army.

On the other hand, with course of action 1 there will be an ever-growing loss of commonality with the U.S. Army as they field the next generation tank, and the Marine Corps

will lose the ability to leverage Army initiatives for future improvements. Modernization is costly and, as the lead in the development for the M1A1, the Marine Corps will be paying the bill no longer able to leverage U.S. Army research and development funds. Although the National Guard will continue to use and maintain the M1A1 and there is the possibility of leveraging the National Guard to offset some of the cost. Lastly, the potential for growth in capabilities for the M1A1 is severely hindered by the fact that it was first developed in the 1980s.

Course of action 2, rebuilding the current M1A1 fleet to the M1A3 currently being developed by the U.S. Army, maintains a reliance of the M1A1 until the U.S. Army completes fielding of the M1A3. The improved technology and inter-operability with the U.S. Army may make the M1A3 a viable future tank for the Marine Corps, and allow for the tank to maintain its current ground dominance.

The advantages include maintaining tank over match well beyond 2050 and continued ammunition commonality with the U.S. Army. The Marine Corps will have the ability to leverage a joint program. The new M1A3 program will allow for a more rapid development and enhancement of technology and the continued ability to leverage U.S. Army schools and supply chain. Additionally, with the development of a new tank there will be a greater overall growth potential.

Some disadvantages include high modernization costs due to the enhanced technology of the new system. The program is U.S. Army centric; accordingly, the Marine Corps will have only a minimal amount of leverage in the actual development of the platform. The platform will maintain its limited deployability and heavy expeditionary footprint similar to the M1A1. Perhaps most critically, the M1A3, due to its increased weight, may not be capable of ship-to-shore movement using today's current platforms.

The third course of action is the pursuit of a new medium joint tank. This course of action pursues the development of a medium tank either through purchasing an already developed medium tank or the joint development of a new platform with the U.S. Army, possibly leveraging the Army's current Ground Combat Vehicle (GCV) program, or a new program similar to the joint strike fighter program. Current threat weapons proliferation make the armor protection of a light tank un-survivable on the modern battlefield. However, while a medium tank has a reduced survivability, it may be sufficient for most operations across the range of military operations.

A joint medium tank would most likely maintain a lethality overmatch versus other tanks and threats throughout the world. It will be able to leverage a joint program and funds from multiple services. It would leverage the latest technology and performance standards, to include various technologies and systems from the M1A3 program. If joint it will maintain an ammunition commonality with the U.S. Army, and allow the Marine Corps to leverage U.S. Army schools and supply chains. Due to its reduced size it will have enhanced strategic and operational mobility and a potential increase in range and fuel economy.²⁶

Although, with a medium tank there will be a loss of heavy armor capability for the Marine Corps and it may limit the Marine Corps' capacity in full spectrum operations. It would require scalable armor to achieve an acceptable survivability requirement. Additionally, the development of a new tank will be costly and will most certainly require the U.S. Army's support in to the program.

The final course of action, a mixed fleet, will maintain a fleet predominately of M1A1 tanks to provide lethality and survivability overmatch in all operations across the range of military operations while procuring a limited number of medium tank platforms (either through

purchase of an existing platform or development of a new platform similar to that of course of action 3) for expeditionary usage in some less kinetic operations. The fleet would maintain its tank lethality and survivability overmatch with the M1A1, but may require scalable armor to achieve acceptable survivability requirements for the medium tank.

This course of action maintains the current advantages and disadvantages of both courses of action 1 and 3, but to a lesser degree of each. There would still be ammunition commonality with the M1A1, but there may not be for the medium tank depending on the type of gun system it may require. The mixed fleet would have enhanced mobility and allow for a tailorable task organization based on the operational requirement. There is a possibility of a reduction in fuel requirements, but training, supply, logistics and program management requirements for a fleet of two types of tanks would be much more complex. Lastly, although this course of action may reduce the overall disadvantages of the previous courses of action, it creates a major disadvantage overall by reducing the amount of tanks available for use relative to the type of operation the Marine Corps is conducting.

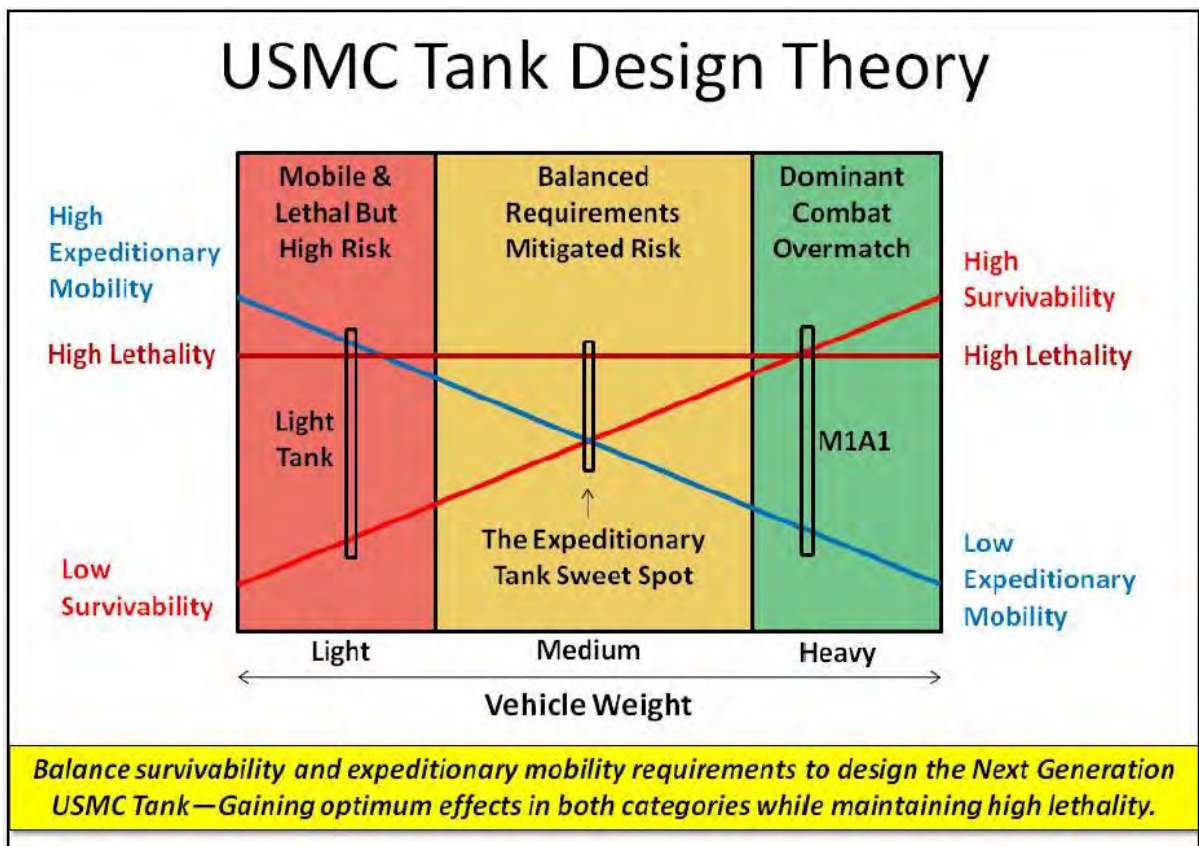
Weighing the Possibilities

Historically, the Marine Corps has demonstrated innovation and foresight in the development arena. It has blazed the path for amphibious operations, heliborne assaults and close air support. The Marine Corps has successfully pioneered the use of the Harrier Vertical Short Take-off Landing aircraft (although developed in Great Britain, the Marine Corps was the first and only U.S. service to utilize it), and developed the Amphibious Assault Vehicle and MV22 Osprey.

However, the Marine Corps was also the only show in town with each of these developments, unlike the tank, which the U.S. Army has always relied upon and maintained a great deal of interest in. In fact, the Marine Corps has never been successful in developing its own armored vehicle for a myriad of reasons, but most notably is the lack of funds and resources available for the development of such a small number of vehicles. The Marine Corps only maintains approximately 200 tanks in its arsenal as opposed to the nearly 2500 in the Army.^{27 28} As a result, the Marine Corps has always reverted back to a tank the Army has already developed. That is to say, it would be financially irresponsible to attempt to develop a different tank than what the U.S. Army has already or is developing. Therefore, the only options for the Marine Corps are the aforementioned courses of action that are partnered with the Army. The development of a medium tank or any other tank without the partnership of the Army is also unfeasible.

To better understand the choices available to the Marine Corps the Tank Operational Advisory Group put together a table in its USMC Tank Vision and Strategy 2025 demonstrating Tank Design Theory (table 1). This table demonstrates a general comparison of light, medium, and heavy tanks balanced against expeditionary mobility, lethality, and survivability. On one extreme there is mobility and the light tank, while the heavy tank and survivability is on the opposite end of the spectrum with a medium tank located in the epicenter of each extreme. Maximum lethality however is possible across the full spectrum of vehicle types due to modern technology and the option of placing a heavier main gun on the light tanks of today.²⁹

Table 1 USMC Tank Design Theory



At first glance using this table, one might assume that going with medium tank is obvious choice for the Marine Corps. After all, it is in direct compliance with the Commandant of the Marine Corps' 2010 Planning Guidance of where he states the Marine Corps is "A middleweight force, we [The Marine Corps] are light enough to get there quickly, but heavy enough to carry the day upon arrival."³⁰ Unfortunately, its not that simple, not only do we need support from the U.S. Army, there are a great deal of other factors that need to be analyzed first.

As evidenced by the history of tanks in the Marine Corps, the Corps has primarily adopted its generation of tanks from the Army. More often then not, as the Army was already fielding its next generation of tanks the Marine Corps would procure the older model and modify, upgrade, and improve upon the existing platform in order to meet the needs of the Marine Corps.

Additionally, the Marine Corps has little to offer the Army by way funding or even staffing in the development of the M1A3. With little “buy in” to the project the Marine Corps precepts and capability requirements will have minimal bearing on the development of the M1A3, most notably the requirement to maintain the capability of ship to shore movement via the existing LCAC and LCU platforms. The loss of this capability for Marine tanks is a show stopper. The current M1A1 is already nearing its maximum threshold of 72 tons per tank for the LCU, and with the new two and a half ton belly armor package developed by the U.S. Army, that is currently being utilized by the tanks in Afghanistan, it already exceeds the threshold.³¹ Additionally, the current M1A2 already violates the weight ceiling in its current configuration. This weight issue is of nominal consequence to the Army due to different deployment requirements established for its tanks. Consequently, the risk of no longer improving the M1A1 with the hope that the M1A3 meets our ship to shore standard would be imprudent.

As previously mentioned in order to develop a medium tank, the Marine Corps would most likely require support from the U.S. Army. However, the U.S. Army has just recently re-organized to form three types of Brigade Combat Teams (BCTs), consisting of a Heavy Brigade Combat Team formed around the Abrams tank and Bradley Fighting Vehicle, a Stryker Brigade Combat Team, formed around the Stryker family of vehicles and the Infantry Brigade Combat Team, fashioned around the foot soldier. Each one of these BCTs bring to the table similar capabilities in the form of a heavy-weight, middle-weight, and light-weight force respectfully. That said it has already invested a great deal of time, money, and doctrinal development for each of these forces. Of special note is the Stryker BCT that acts as its middle-weight force. Not only does the BCT form around the Stryker, but each company has an additional platoon of Stryker Mobile Gun System (MGS) variants each with a 105mm main gun.³² The U.S. Army too is

undergoing fiscal restraints and it is not likely to change its middle-weight force when it already has the capability integrated in its organization.

The procurement of a pre-existing medium tank still remains an option for the Marine Corps. There are a multitude of medium tanks that currently exist throughout the world, but many of them are as old as the M1 series tanks, and would need upgrading in the same manner as the current Abrams. However, the Marine Corps would still have to abide by the Armed Services Procurement Act that would require the tanks be built in the United States, and it would still require nearly the same rigorous testing and development as a tank developed in the United States.

If the Marine Corps was able to procure or develop a medium tank there are other considerations that must be looked at for course of action 3. In a study conducted for the U.S. Army by the Rand Corporation in 2008, titled *In the Middle of the Fight: An Assessment of Medium-Armored Forces in Past Military Operations*, a close look was taken at medium-armored forces from past operations to help the Army decide how to transform its forces to better meet in challenges in the future. The study utilized 12 different case studies (figure 1) starting with the 1936 Spanish Civil War to the period of 2003-2005 in Iraq, ranging across the full range of military operations. The below quote is a short summary of its findings.

In short, this monograph suggests that medium-weight armor enjoys only four clear advantages over heavy armor: rapid deployability (particularly with air-droppable vehicles), speed over roads, trafficability in infrastructure not suited to heavy armor, and lower logistical demands. It furthermore suggests that these advantages are exploitable only in conditions where the resulting diminution of combat power can be accepted or compensated for by other means. Because the U.S. Army cannot expect all future operations to occur in such circumstances, it would be prudent to maintain a mix of heavy, medium-armored, and light forces that can be task-organized and employed in conditions that best match their attributes. Medium-armored forces have much to offer in such a mix.³³

As the Rand study suggests, medium forces have a great deal to offer across the range of military operations, as long as these forces can be augmented with combined arms to better meet a more lethal and survivable threat, as was the case with Marine Corps Light Armored Vehicles supported by superior close air support and indirect fire during desert storm.³⁴

Table 2-Case Studies from *In The Middle of The Fight*

Case	Complex Terrain	Point in the Range of Military Operations	Type of Operation	Types of Armored Vehicles and Other Forces
Armored warfare during the Spanish Civil War (1936–1939)	Broken and mountainous; urban	High	Major operations (civil war with external support to both sides)	German and Italian medium-armored vs. Soviet Union heavy
U.S. armored divisions in France and Germany during World War II (1944–1945)	Urban; hedgerows; forests	High	Major operations	U.S. medium-armored vs. German heavy
Armored cavalry and mechanized infantry in Vietnam (1965–1972)	Jungle	High	Major operations; counterinsurgency operations	U.S. medium-armored and heavy vs. Viet Cong and North Vietnamese light
Soviet airborne operations in Prague, Czechoslovakia (1968)	Urban	Middle	Strike (regime change)	Soviet Union medium-armored and heavy vs. Czechoslovakian light (mainly civilian forces)
South Africa in Angola (1975–1988)	Close; undeveloped infrastructure	Middle	Major operations; raids	South African medium-armored vs. Angolan heavy
Soviet Union in Afghanistan (1979–1989)	Urban; mountains; undeveloped infrastructure	Middle	Strike (regime change); counterinsurgency operations	Soviet Union medium-armored and heavy vs. Afghan light
Operation Just Cause, Panama (1989)	Urban	Middle	Strike (regime change)	U.S. medium-armored vs. Panamanian medium and light
1st Marine Division light armored vehicles (LAVs) in Operations Desert Shield and Desert Storm, Southwest Asia (1990–1991)	Desert; limited visibility	High	Major operations	U.S. (Marine Corps) medium-armored vs. Iraqi heavy and medium
Task Force Ranger in Mogadishu, Somalia (1993)	Urban	Low	Raid	U.S. light and coalition (Malaysian and Pakistani) medium-armored vs. Somali light
Russia in Chechnya I (1994–1996) and II (1999–2001)	Urban; mountains	Middle	Counterinsurgency operations; combating terrorism	Russian medium-armored and heavy vs. Chechen light
Australia and New Zealand in East Timor (1999–2000)	Urban; jungle; undeveloped infrastructure	Low	Peace operations	Australian and New Zealand medium-armored vs. rebel light
SBCTs in Operation Iraqi Freedom (OIF) (2003–2005)	Urban	Middle	Counterinsurgency operations; combating terrorism	U.S. medium-armored vs. indigenous Iraqi and foreign fighter light

As the previous study suggests a force with heavy, medium, and light capability resident in its organization would be the most successful across the range of military operations. Lending one to assume that course of action 4, the mixed fleet would be the preferred method for the Marine Corps. This would meet the guidance set forth by the Commandant of the Marine Corps

requiring the Marine Corps to be a “middleweight force...heavy enough to carry the day upon arrival.”³⁵ However, this doesn’t take into account the assets that currently exist in the Marine Corps, such as the Light Armored Vehicle. The Light Armored Vehicle has already proven itself a capable force when augmented by combined arms such as aviation, artillery and heavy tanks. The procurement of a medium tank whether part of a mixed fleet of tanks or a complete transfer of tanks would only duplicate an existing capability already in the table of organization of the Marine Corps, and remove or reduce the survivability of the heavy tank. The one platform that can stand side by side with the infantry in the most violent of fire fights against the most lethal of adversaries.

Recommendation

The M1A1 currently in use by the Marine Corps continues to this day meet the requirements set forth in the roles, mission, and precepts outlined in the paper, and will continue to do so with minimal selected upgrades out to 2040 and will not lose its dominant combat overmatch on the battlefield well beyond 2025. By then, the new M1A3 will be entirely finished with development and most likely fielded or in the process of being fielded in the U.S. Army even under the current budget constraints. Until that time the Marine Corps should continue its current path using the M1A1 and determine upon its fielding whether or not the M1A3 will better meet the needs of the Marine Corps.

In the words of Secretary of Defense Gates, “The need for heavy armor and firepower to survive, close with and destroy the enemy will always be there, as veterans of Sadr City and Fallujah can no doubt attest.”³⁶ Yet, one can expect the number of heavy armor platforms the U.S. Army maintains in the future will be highly scrutinized and possibly cut as evident by the

same speech by Gates, “...But as the prospects for another head-on clash of large mechanized land armies seem less likely, the Army will be increasingly challenged to justify the number, size, and cost of its heavy formations to those in the leadership of the Pentagon, and on both ends of Pennsylvania Avenue, who ultimately make policy and set budgets.”³⁷ With that the Marine Corps will be less likely to get support from the U.S. Army during competing interests on the battlefield should the need arise for heavy tanks.

As a final point, no one can argue that heavy tanks play a major role in the most kinetic of combat such as tank on tank battles. However, as another study from the Rand Corporation called *An Army for Full Spectrum Operations: Lessons from Irregular Wars* shows, heavy tanks play a pivotal role in even the less kinetic fights encountered in the counter-insurgency fight.

Heavy forces—based on tanks and infantry fighting vehicles—are key elements of any force that will fight hybrid enemies that have a modicum of training, discipline, organization, command and control, and advanced weapons (e.g., ATGMs, MANPADS, RPGs, mines, and IEDs). Light and medium forces complement heavy forces in hybrid warfare, particularly in urban and other complex terrain, but they do not provide the survivability, lethality, or mobility inherent in heavy forces. Quite simply, heavy forces reduce operational risks and minimize friendly casualties.³⁸

Conclusion

Each of these four courses of action has been pursued throughout the history of tanks in the Marine Corps with varying degrees of success. Each needs to be developed and examined in much greater detail than this paper allows, ensuring that one or more of these courses of action is not only viable and acceptable for the tank fleet to maintain its current dominant combat overmatch across the full spectrum of conflict, but also financially, technologically and physically practical and responsible as well. The role of tanks in the Marine Corps, and even the tank battalion mission has virtually remained unchanged throughout its illustrious history and the

precepts discussed above remain grounded in the historical testaments of the tank fleets of the past.

Despite the current fiscal constraints, the tank has more than proved its usefulness in the Corps. Its survivability, lethality and mobility remain unequaled on the battlefield. It is the one platform that provides the MAGTF with the capability of armored maneuver, and provides lethal and survivable close support to the infantry as an integral part of the combined arms team. Its ability to locate, close with and destroy the enemy with a reasonable assurance of survival and lethality overmatch, provide expeditionary armored firepower and shock effect, and provide persistent overwatch and precision direct fire in support of the infantry has (and will continue) to necessitate its existence in the Corps.

¹ *Marine Corps Tankers Assoc.* (Paducah: Turner Publishing Company, 1999), 6.

² *2011 Tank Conference Report.* (Dated 02 Feb 2011)

³ Kenneth E. Estes. *Marines Under Armor: The Marine Corps and the Armored Vehicle from 1916-2000.* (Annapolis: Naval Institute Press, 2000) 8.

⁴ *Marine Corps Tankers Assoc.*, 6.

⁵ *Marine Corps Tankers Assoc.*, 6.

⁶ *Marine Corps Tankers Assoc.*, 6.

⁷ *Marine Corps Tankers Assoc.*, 7.

⁸ General Donn A. Starry. *Armored Combat In Vietnam.* (Indianapolis/New York: The Bobbs-Merrill Company, Inc., 1980), 53.

⁹ Estes, 185.

¹⁰ Estes, 85.

¹¹ David E. Johnson and John Gordon IV. *Observations on Recent Trends in Armored Forces.* (Santa Monica, Ca: RAND Corporation, 2010), pg 2.

¹² 2011 Tank Conference Report.

¹³ “USMC Tank Vision and Strategy 2025”. (Working Paper, Tank Operational Advisory Group, 21 Jun 2011), 3.

¹⁴ Robert M. Gates. Speech given by the Secretary of Defense, (The Military Academy, West point, NY, February 25, 2011).

¹⁵ Gates.

¹⁶ James F. Amos. *35th Commandant of the Marine Corps Commandant’s Planning Guidance: 2010*, 3.

¹⁷ *Observations on Recent Trends in Armored Forces*, 5.

¹⁸ Amos, 3.

¹⁹ 2011 Tank Conference Report.

²⁰ Headquarters United States Marine Corps. *Amphibious Ships and Landing Craft Data Book*. MCRP 3-31B (Washington DC: U.S. Marine Corps, Aug 2001), 24.

²¹ *Amphibious*, 25.

²² Headquarters Department of the Army. *Tank and Mechanized Infantry Team*. FM 3-90.1 (Washington DC: U.S. Department of the Army, Dec 2002), 11-26.

²³ Headquarters United States Marine Corps. *Organization of Marine Corps Forces*. MCRP 5-12D (Washington DC: U.S. Marine Corps, Nov 2003), 4-17.

²⁴ 2011 Tank Conference Report.

²⁵ “USMC Tank Vision and Strategy 2025”, 12.

²⁶ David E. Johnson, Adam Grissom and Olga Olikier. *In the Middle of the Fight: An Assessment of Medium-Armored Forces in Past Military Operations*. (Santa Monica, Ca: RAND Corporation, 2008), xvi.

²⁷ Headquarters Department of the Army. *Army Modernization Plan 2012*. (Washington DC: U.S. Department of the Army, May 2011) 27.

²⁸ These numbers only take into account those used in active and reserve battalions in the USMC and USA. It does not include additional tanks that are fielded and stored for combat replacements or maritime pre-positioning or National Guard.

²⁹ “USMC Tank Vision and Strategy 2025”, 10.

³⁰ Amos, 5.

³¹ Headquarters United States Marine Corps. *Amphibious Ships and Landing Craft Data Book*. MCRP 3-31B (Washington DC: U.S. Marine Corps, Aug 2001), 25.

³² Headquarters Department of the Army. *The Brigade Combat Team*. FM 3-90.6 (Washington DC: U.S. Department of the Army, Aug 2006), A-7.

³³ *In the Middle of the Fight*, xvi.

³⁴ Johnson. *In the Middle of the Fight*, xiv.

³⁵ Amos, 3.

³⁶ Gates.

³⁷ Gates.

³⁸ *Observations on Recent Trends in Armored Forces*, 6.

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Appendix A – Additional Tank Photos

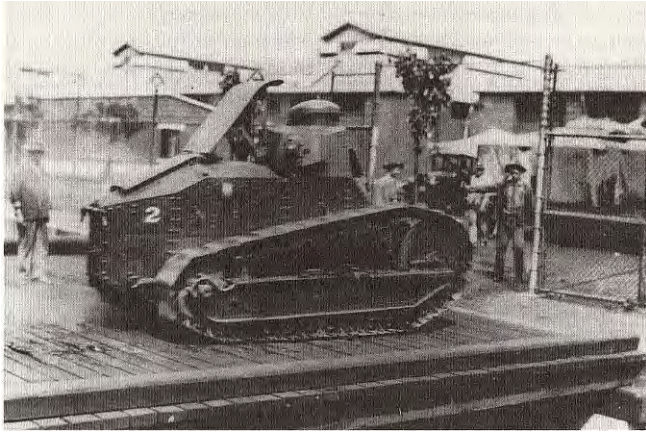


Figure 3-Model 1917 French Renault Tank operating with the Marines in China³⁹



Figure 4 - Marmon-Harrington being load- tested with the standard US Navy 38 foot tank lighter September 1939.⁴⁰



Figure 5 - A USMC M2A4 tank in combat on Guadalcanal.⁴¹



Figure 6 - Marine Corps M4 Shermans landing at Iwo Jima⁴²



Figure 7 – USMC flame-thrower tank in action near Da Nang, Vietnam.⁴³



Figure 8 - U.S. Marines advance past an M48 Patton tank during the battle for Hue.⁴⁴



Figure 9 – USMC M-60 Patton breaching a sand berm during Operation Desert Shield.⁴⁵



Figure 10 - An M1A1 Abrams tank loads onto a C-17 in Kuwait for a tour in Afghanistan.⁴⁶

³⁹ Estes, 106.

⁴⁰ Estes, 107.

⁴¹ George Forty. *A Photo History of Tanks in Two World Wars*, (New York: Sterling Publishing Co, 1984), 142.

⁴² Forty, 161.

⁴³ Donn A. Starry. *Armored Combat In Vietnam*. (Indianapolis/New York: The Bobbs-Merrill Company, Inc., 1980), 53.

⁴⁴ Vietnam War Facts: Information and Facts on the Vietnam War. *When was the First U.S. Battle of the Vietnam War?* Posted Aug 4, 2011, <http://www.vietnamwarfacts.net/vietnam-war-battles.html>.

⁴⁵ Jason W. Henson. *M-60 Patton / Magach-6/7 MBT*. The HarpoonHQ database & encyclopedia web application, <http://www.harpoondatabases.com/Encyclopedia/Entry2026.aspx>.

⁴⁶ “USMC Tank Vision and Strategy 2025”, 11.